

High-mobility Inkjet Printed FET device Fabrication based on Solution Grown p-CuO Nanoparticles

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Inkjet-printing generally deals with polymer or metal nanoparticles based inks for its various applications. However, due to major dispersion problem inorganic nanoparticles based ink-formulation hindered its possible application. In this regards, we have successfully synthesized inorganic CuO nanoparticles (NPs) by a simple solution process. As-synthesized nanoparticles were investigated in detail in terms of structural and optical characterization, and further formulated well-dispersed inks using mixed solvents of water, ethanol, isopropanol and diethylene glycol. Ink-jetting behavior of the as-formulated inks samples were examined with printing lines on Si/SiO₂ substrates as a function of CuO NPs concentration at room-temperature printing condition. It was observed that the CuO concentration and the number of over-printing are important factors for optimizing the uniformity and thickness of printed lines with smooth edge definition. In this report, we present first results of inkjet printed CuO field effect transistors (FET) with high carrier mobility, which can be applied further for various applications.